

A new species of *Barycholos* from Estado Goiás, Brasil  
(Amphibia, Anura, Leptodactylidae)  
with remarks on related genera

by John D. LYNCH \*

**Abstract.** — *Barycholos savagei* is named on the basis of specimens from the upper Rio Araguaia drainage in western Goiás, Brasil, more than 3 200 km ESE of the distribution of its only congener, *B. pulcher*. In spite of the external similarities among *Adenomera*, *Barycholos*, the *fuscus* group of *Leptodactylus*, *Lithodytes*, and *Vanzolinius*, *Barycholos* seems most closely related to frogs of the *discoidalis* group of *Eleutherodactylus*. *Phyzelaphryne miriamae* Heyer (type-locality, Igarapé Puruzinho at Rio Madeira, Estado Amazonas, Brasil) is a synonym of *Eleutherodactylus nigrovittatus* (Andersson).

**Résumé.** — *Barycholos savagei* est décrit d'après des spécimens qui ont été récoltés dans le bassin supérieur du Rio Araguaia (partie ouest de l'État de Goiás au Brésil) à plus de 3 200 km est sud-est de l'aire de distribution de son seul congénère, *B. pulcher*. En dépit des similitudes externes entre *Adenomera*, *Barycholos*, les *Leptodactylus* du groupe *fuscus*, *Lithodytes* et *Vanzolinius*, *Barycholos* semble plus étroitement relié aux *Eleutherodactylus* du groupe *discoidalis*. *Phyzelaphryne miriamae* Heyer (localité-type : Igarapé Puruzinho dans le bassin du Rio Madeira, État de l'Amazonie au Brésil) est un synonyme d'*Eleutherodactylus nigrovittatus* (Andersson).

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During a visit to the U.S. National Museum of Natural History (Washington, D. C.), I found three specimens of a leptodactylid frog from western Goiás, Brasil. The specimens were incorrectly identified in that collection as *Eleutherodactylus conspicillatus* (Günther). As nearly as I can discern, the misidentification was made by the late Doris M. COCHRAN but was never reported in the literature. The frogs were part of an exchange from the Muséum national d'Histoire naturelle (Paris). The larger series of specimens in Paris is better preserved than are the USNM specimens and was misidentified as *E. binotatus* (Spix). Presumably, COCHRAN realized that the frogs were not *E. binotatus* (about whom she published an account, COCHRAN, 1955) but inexplicably she assigned them to *E. conspicillatus*.

The frogs are not *Eleutherodactylus* because they lack the discs on the ventral surfaces of the digit tips characteristic of *Eleutherodactylus*, *Sminthillus*, *Syrrophus*, and *Tomodactylus* (LYNCH, 1971, 1975a, 1975b). The pectoral girdle has a calcified, style-like sternum and the omosternum is calcified posterior to the manubrium (fig. 1). Calcified, style-like sterna purportedly characterize frogs of the subfamily Leptodactylinae (Lynch, 1974). The Goiás frogs resemble *Adenomera*, *Barycholos*, and *Lithodytes* in several features but the sternal architecture is unique to *Barycholos*.

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The Goiás frogs are very similar to *Barycholos pulcher* (redescribed by HEYER, 1969) but differ in some trivial features. The geographic hiatus (3250-3350 km) elegantly focuses on our ignorance concerning Amazonian frogs. The Goiás population is here named.

***Barycholos savagei* sp. nov.**

HOLOTYPE : MNHNP 1946-328, an adult female taken between the Rio Tapirapé and Conceicao, Estado Goiás, Brasil, in 1931 by Dr. J. VELLARD.

PARATYPES : USNM 130184 (topotype) ; MNHNP 1946-327 (and 327 a-k), USNM 130182-83, collected at Bananal and Rio Vermelho, Estado Goiás, Brasil, by Dr. J. VELLARD.

DIAGNOSIS : A small leptodactylid frog (four males 20.3-22.2 mm SVL, two adult females 30.4-31.2 mm SVL) resembling the species of *Adenomera*, *Barycholos*, *Lithodytes*, *Vanzolinius*, and *fuscus* group of *Leptodactylus* in having broad, arched vomerine odontophores, in lacking nuptial asperities (or swollen thumbs) in males, and in lacking melanophores on the large eggs. *Barycholos pulcher* and *B. savagei* differ from *Adenomera*, the *fuscus* group of *Leptodactylus*, *Lithodytes*, and *Vanzolinius* in having calcified, style-like sterna which bifurcate posteriorly and support separate xiphisternal elements (fig. 1). *Barycholos savagei* differs from *B. pulcher* in having a tarsal fold instead of a tarsal tubercle, in having a sharp canthus rostralis (indistinct, rounded in *B. pulcher*), and in lacking vocal slits and a vocal sac (sometimes absent in *B. pulcher*).

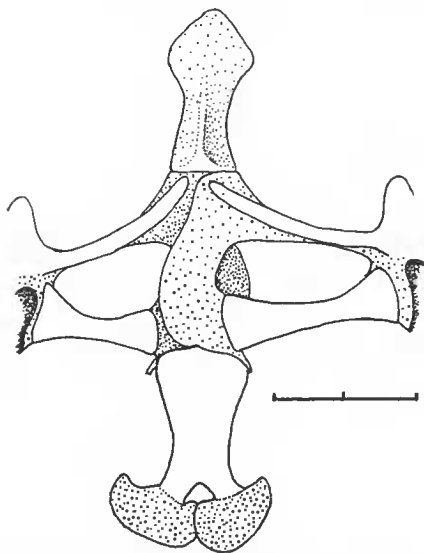


FIG. 1. — Ventral view of pectoral girdle of *Barycholos savagei* sp. nov. (MNHNP 1946-327A). Cartilage is stippled. The mesosternum (not stippled) is calcified. Scale equals 2 mm.

DESCRIPTION

Head as wide as body or slightly narrower than body (gravid females) ; head wider than long ; snout subacuminate in dorsal view, rounded in lateral profile ; nostrils directed dorsolaterally, not protuberant ; canthus rostralis sharp, straight ; loreal region flat, sloping

abruptly to lips ; lips not flared ; interorbital space flat, broad ; no cranial crests ; upper eyelid lacking pungent tubercles or folds ; supratympanic fold evident, ending above insertion of arm ; postrietal tubercles suborbital (fused to form a short ridge in some examples) ; tympanum prominent, annulus distinctly elevated ; tympanum separated from eye by distance equal  $1/3$  to  $1/2$  tympanum length ; tympanum slightly higher than long.

Choanae relatively small, round, not concealed by palatal shelf of maxillary arch when roof of mouth is viewed from directly above ; vomerine odontophores prominent, broad,  $2\ 1/2$  times as wide as long, lying posterior to choanae, each about size of a choana, separated on midline by distance about 2 to  $2\ 1/2$  times width of a choana ; the odontophore is angled very slightly posteriad and bears a row of 8-10 teeth ; tongue longer than wide, its posterior border not notched, its posterior  $1/4$  not adherent to floor of mouth ; makes lack voeal slits and voeal sae.

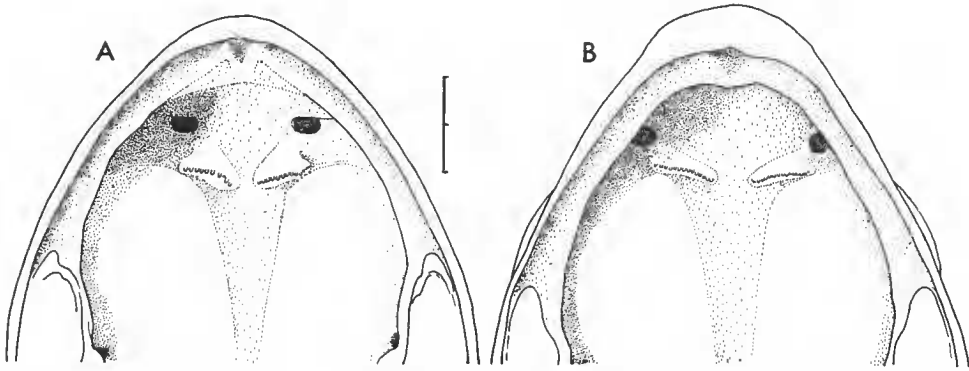


FIG. 2. — Palates of (A) *Eleutherodactylus nigrovittatus* (MNHNP 1978-2839) and (B) *Barycholos savagei* (MNHNP 1946-327A). Scale is 2 mm.

Skin of dorsum and upper surfaces of limbs finely shagreened ; a narrow transverse ridge of warts on back just posterior to scapulae (not reaching dorsolateral folds) ; low dorsolateral folds extending from eye posteriorly but disappearing at about level of sacrum ; a second fold, also originating at the posterior edge of the upper eyelid, diverges ventrally below the dorsolateral fold (toward the groin), it too, is incomplete ; vent not extended in sheath ; skin below and posterolateral to vent (and extending onto undersides of thighs) bearing large areolations ; all other ventral surfaces smooth ; discoidal folds distinct.

Forearm bearing ulnar tubercles, tubercles not prominent ; palmar tubercle longer than wide but not indented distally (nor divided),  $1\ 1/2$  times size of oval thenar tubercle ; supernumerary palmar tubercles pungent, 6 to 8 in number, nearly as large as proximal subarticular tubercles ; basal subarticular tubercles large, elevated, more or less round ; distal subarticular tubercles only  $1/2$  so large as basal ones ; fingers bear hints of lateral keels ; fingers lacking discs and pads ; first finger much longer than second ; thumb of male neither swollen or bearing nuptial asperities.

No folds or tubercles on knee or heel ; outer edge of tarsus lacking tubercles ; inner edge of tarsus bearing sickle-shaped fold (and tubercle) about  $2/5$  from distal end ; inner meta-

tarsal tubercle oval (length 1 1/2 times width), elevated, 3 times size of round, subeonical outer metatarsal tubercle; several supernumerary plantar tubercles present, not prominent, all much smaller than eonical subarticular tubercles; subarticular tubercle on first toe narrowly separated from inner metatarsal tubercle; toe tips less swollen than finger tips, lacking pads and discs; toes bearing feeble lateral fringes (most evident towards bases of toes); heels of flexed hind legs broadly overlapping.

Brown above with indefinite brown transverse mark just posterior to scapulae (brown bar rests on a transverse ridge of warts). In several smaller individuals this brown bar is the top of an hourglass-shaped mark. Canthal streak and supratympanic stripe dark brown. Indefinite suprainguinal bar (brown). Labial bars faint. Flanks brown with cream vermiculation extending up from venter. Pale area in groin continuous with pale venter. Some brown flecking on throat, otherwise, all ventral surfaces cream. Limbs indistinctly barred, if bars are evident they are transverse and as wide as or slightly wider than the pale interspaces. Posterior surfaces of thighs brown with a few cream flecks; anal triangle slightly darker. In some individuals the ground color is gray-brown; in these frogs a brown interorbital triangle is evident and a brown area on the shoulder tapers ventrally onto the flanks.

MEASUREMENTS OF HOLOTYPE (in mm): SVL 30.4; shank 17.2; head width 10.2; head length 9.8; upper eyelid with 2.5; IOD 2.9; tympanum length 2.1; eye length 4.0; eye-nostril distance 2.6. The holotype is a gravid female with strongly convoluted oviducts.

ETYMOLOGY: A patronym, for Jay M. SAVAGE, who has significantly contributed to leptodaetylid systematics.

DISTRIBUTION: Known only from the type specimens, collected in western Goiás state in Brasil.

VARIATION: Aside from the points raised in the description, *B. savagei* (as thus far known) is not variable. Minor differences in proportions are summarized in table 1.

#### THE RELATIONSHIPS OF *Barycholos*

The only leptodaetylid frogs having sterna resembling those of the two species of *Barycholos* are some species of *Physalaemus* (see plate 2 in BARRIO, 1965 and figure 2 in PARKER, 1927) and some *Pleurodema* (Parker, 1927: 477). The sternal styles of *Physalaemus* and *Pleurodema* are distinctly osseous in contrast to the sternal styles of *Barycholos* which are calcified. *Barycholos* is further distinguished from these genera in that the vomerine odontophores are massive, partially arched structures lying posteriad to the choanae (fig. 2), whereas in *Physalaemus* and *Pleurodema*, vomerine odontophores are lacking or, if present, are small and support a clump of teeth.

LYNCH (1971, 1973) considered *Barycholos* most closely allied to *Adenomera* whereas HEYER (1969, 1975) considered it most closely allied to *Eleutherodactylus*. HEYER (1974a) attempted to insert *Barycholos* into the several clusters within the Leptodaetylinae but with little success and concluded (informally) that *Barycholos* was not closely related within that assembly (which includes *Adenomera*). HEYER's (1974a, 1974b, 1975) analyses have a cladistic methodologic base and are thus subject to ready reinterpretation.

Dr. HEYER and I differ in our approaches to the common data base in two critical points. I insist that if a character-state is to be recognized (or used) it must be discrete

TABLE 1. — Size and proportions of *Barycholos savagei* and *Eleutherodactylus nigrovittatus*.  
 First line gives range ; second gives mean  $\pm$  2 standard errors (sample size).

	SVL (in mm)	Tibia/SVL	head width/SVL	upper eyelid/IOD	tympanum/eye	E-N/eye
<i>Barycholos savagei</i>						
males	20.3-22.2 21.6(5)	55.6-60.4 57.7(5)	33.3-36.0 34.8(5)	81.8-100.0 94.7(5)	50.0-58.6 54.5(5)	71.4-79.3 73.8(5)
females	30.4-31.2 30.8(2)	56.6 (1)	32.9 (1)	86.2 (1)	52.5-56.2 54.4(2)	65.0-78.2 71.6(2)
juv. females	22.2-26.0 24.5 $\pm$ 0.7(9)	59.6-63.5 60.8 $\pm$ 1.1(7)	33.1-37.2 35.3 $\pm$ 1.0(7)	85.2-109.1 94.7 $\pm$ 7.3(7)	48.4-60.0 55.6 $\pm$ 2.3(9)	70.6-83.9 79.2 $\pm$ 2.9(9)
<i>Eleutherodactylus nigrovittatus</i>						
males	16.1-18.8 17.7 $\pm$ 0.5(12)	43.6-50.6 46.9 $\pm$ 1.0(12)	37.1-41.4 39.6 $\pm$ 0.8(10)	61.9-80.0 69.9 $\pm$ 5.0(7)	38.1-50.0 44.8 $\pm$ 3.1(8)	82.6-100.0 92.2 $\pm$ 4.6(8)
females	20.1-22.0 21.1 $\pm$ 0.6(7)	43.6-47.1 45.4 $\pm$ 1.0 (7)	39.2-41.8 40.4 $\pm$ 0.6(7)	65.2-82.6 73.2 $\pm$ 5.9(6)	42.6-57.1 47.2 $\pm$ 4.6(6)	81.5-104.8 94.8 $\pm$ 7.5(6)

from all other character-states. HEYER (1974a, 1974b) partitioned the variation in the relationship of the posterior extent of the sphcnethmoid relative to the optic foramen into three character-states even though at least some of the variation is continuous. Secondly, I insist that OTUs exhibit a single character state. Many of the traits employed by HEYER (1974a, 1974b, 1975) suffer because although variation is discontinuous, more than one state occurs in an OTU (fig. 3). HEYER's solution to this problem (of which he was aware) was frequently to create a state of variable states of the following form :

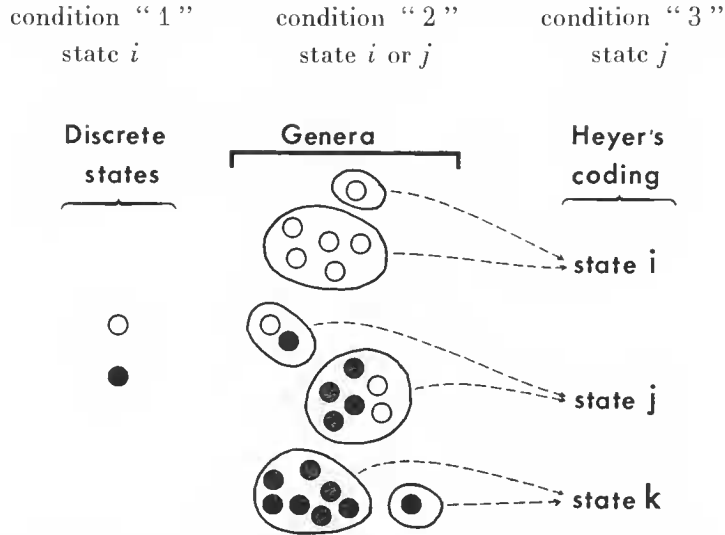


FIG. 3. — Schematic of coding system employed by HEYER (1974b) for several characteristics.

The only defensible approaches are (1) to discard the characteristic, or (2) to partition the OTU. To do neither creates an illusion.

HEYER (1974a) analyzed 50 characteristics, recognized 2 to 5 states per character, and assigned polarities within each characteristic. The data were collected for 29 species of frogs. In a subsequent analysis, HEYER (1974b) used 17 characteristics (including two not previously used) to analyze the relationships among *Adenomera*, *Leptodactylus*, *Lithodytes*, and *Vanzolinius* (a generic clustering noted by HEYER, 1974a).

HEYER (1974a) generated two phylogenetic diagrams for leptodactyline frogs using 92 derived character-states. The diagrams clustered *Physalaemus*, *Pleurodema*, and *Pseudopaludicola* as one unit and *Adenomera*, *Leptodactylus*, *Lithodytes*, and *Vanzolinius* as a second. In one case, *Barycholos* clustered with *Adenomera* but in the other it was loosely associated with *Edalorhina*. In HEYER's analyses, *Edalorhina*, *Hydrolaetare*, *Linnomedusa*, and *Paratelmatobius* did not associate with either unit.

HEYER also evaluated the character states so as to seriate states from best to worst. Eleven states were identified as 'best', 19 others as 'useful', 22 as 'neutral', and 35 as 'of negative value' (accounting for 87 states [88 if ≠ 90, a single species occurrence, is added to the list of 'neutral' states]).

HEYER's choice (fig. 7) between his 'old phylogeny' (where *Barycholos* clusters with *Adenomera*) and his 'new phylogeny' (where *Barycholos* is tenuously associated with *Edalorhina* and thus not part of the leptodactyline subgroup) was made because "The new phylogeny has nine fewer character state convergences than the old phylogeny and the relationships among *Lithodytes*, the *marmoratus* group, and the remaining *Leptodactylus* are tightened up." and "This is consistent with all three groups being recognized as part of the same genus from time to time" (HEYER, 1974a : 29).

The major difficulties with this seemingly reasonable decision are : (1) where do the 9 fewer convergences occur — in best, useful, neutral, or negative character states ? ; (2) what is the meaning of 'tightened up' ? ; and (3) how germane is the observation that previous workers from time to time associated a collection of species in a single genus ?

I compared the phylogenetic diagrams and observed the following : the new phylogeny required two fewer convergences for each of five states (28, 30, 60, 79, 89) and one fewer for each of seven others (14, 31, 38, 53, 54, 62, 91). This is an improvement of saving 17 convergences. It also requires an extra convergence for each of ten character states (7, 19, 23, 24, 25, 40, 43, 49, 83, and 84). The net savings (table 2) is seven fewer convergences (I was unable to discover the other two reported by HEYER). The additions are skewed toward the 'best' extreme and the reductions are skewed toward the negative extreme. Each therefore indicates that the 'new phylogeny' is contrary to the efforts to obtain the best phylogeny. Somewhat corroborative support for this conclusion is gathered from one of HEYER's (1974a : 38) predictions based on the new phylogeny ["According to the diagram (fig. 7) a foam nest is not required for *Lithodytes*, *Barycholos*, *Edalorhina*, *Hydrolaetare*, or *Paratelmatoobius*..."]. However, *Edalorhina* uses a foam nest in essentially the same fashion as does *Physalaemus* (James P. BOGART, William E. DUELLMAN, personal communications). Therefore, although the new phylogeny requires fewer convergences, it reduces convergences among the worst character states and adds convergences among the better character states. Such an improvement is an illusion.

HEYER's second and third reasons for preference of the new over the old phylogeny are clearly related. The "tightening up" of relationships is accomplished by emphasizing

TABLE 2. — Distribution of convergences among quality categories comparing HEYER's (1974a) 'old phylogeny' with his 'new phylogeny' (and the positioning of *Barycholos*). Adding or reducing convergences is relative to the new phylogeny.

QUALITY CATEGORY	ADD CONVERGENCES	REDUCE CONVERGENCES
Best	23, 83	
Useful	7, 19, 24, 25, 84	<i>30, 54, 89</i> *
Neutral	43	<i>28, 79</i>
Negative	40, 49	14, 31, 38, 53, <i>60, 62, 91</i>

\* States in italics are those reducing convergences by two each.

those traits which unite what HEYER later concludes are the genera *Adenomera*, *Leptodactylus*, *Lithodytes*, and *Vanzolinius* back into the genus *Leptodactylus sensu lato*. HEYER evidently does not consider it germane that BOULENGER (1898) described *Barycholos pulcher* as a *Leptodactylus* where it remained until HEYER (1969) removed it. COCHRAN'S (1938, 1955) inclusion of *Paratelmatobius gaiageae* in *Leptodactylus* does not prompt serious consideration that the phylogenetic diagram be engineered in such a way to show *Paratelmatobius* and *Leptodactylus* as a terminal bifurcation. These examples are admittedly spurious but emphasize my point that the errors (if errors they be) of previous systematists are completely immaterial to the support of a given phylogenetic diagram.

If one requires both unique OTUs and unique states, one solution is to discard HEYER'S (1974b) characteristics of Voecal saes, Male Thumbs, Body glands, Toe disks, Toe webs, Egg pigment, Geniohyoideus lateralis musele, Sternohyoideus origin, Graeilis minor musele. Frontoparietal fontanelle, Vomer articulation, Sphenethmoid-optic foramen, Anterior extent of sphenethmoid, and Aeroecentric chromosomes, resulting in the 'loss' of 14 of 17 characteristics. Another solution is to openly examine the genera (if they are accepted *a priori*, many characteristics useful at one level of analysis must be discarded). [For example, if *Adenomera andreae* and *A. marmorata* are separated from *A. bokermanni*, *A. hylaedactylus*, and *A. martinezi*, the former group has toe pads and the latter exhibits the primitive state (i.e., no pads)].

The three remaining characteristics (Sternohyoideus musele insertion, Terminal phalanges, and Diploid chromosomes) do not impress me as adequate to generate a robust phylogenetic diagram. HEYER'S (1974a) coding of variation in the form of the terminal phalanges is not consistent with my observations on *Adenomera hylaedactyla*, and the direction is contraindicated by NOBLE'S (1917) study of ontogenetic changes in the degree of bifurcation in *Leptodactylus* (and *Adenomera* as well). In view of the variability in diploid chromosome number for *Adenomera* thus far reported from only some of the species (HEYER, 1974b) and the absence of data for either species of *Barycholos*, I am not willing to consider this trait significant. The sternohyoideus insertion trait was reported to exhibit three states (HEYER, 1974a). HEYER (1974a) recorded a derived condition in *Barycholos pulcher*, 3 *Adenomera* (*andreae*, *bokermanni*, and *martinezi*), *Lithodytes lineatus*, *Hydrotaetare schmidti*, and *Paratelmatobius lutzi*, and a more derived state in the other 2 *Adenomera* (*hylaedactyla* and *marmorata*) and in 3 of 5 species of *Physalaemus*. Although inspection of HEYER'S (1974a : 10, fig. 1) illustrations allows easy sorting of the five species of *Adenomera* into two groups, one's conviction that these are different character states from some conditions coded as primitive is eroded by the same illustration.

The data set employed by HEYER (1974a, 1974b) is seriously flawed by aprioristic interference and by the ensuing injudicious coding of variability in characteristics. Erroneous coding of information may have contributed to the problem (e.g., *Lithodytes lineatus* has dorsolateral stripes but not dorsolateral folds, it has narrow lateral fringes on the toes rather than lacking lateral fringes, it has digital pads [not discs as previously reported by LYNCH, 1971, 1973, and so coded by HEYER, 1974a, 1974b] but no dorsal scutes, and males lack voecal slits and a voecal sae [HEYER'S "no external voecal sae" apparently means "internal voecal sae present" but is not so described; it seems unlikely that he meant "no external voecal sae" to include both "internal sac present" and "no voecal sae"]. Resolution of the relationships of the leptodaetyline genera requires (1) that the genus



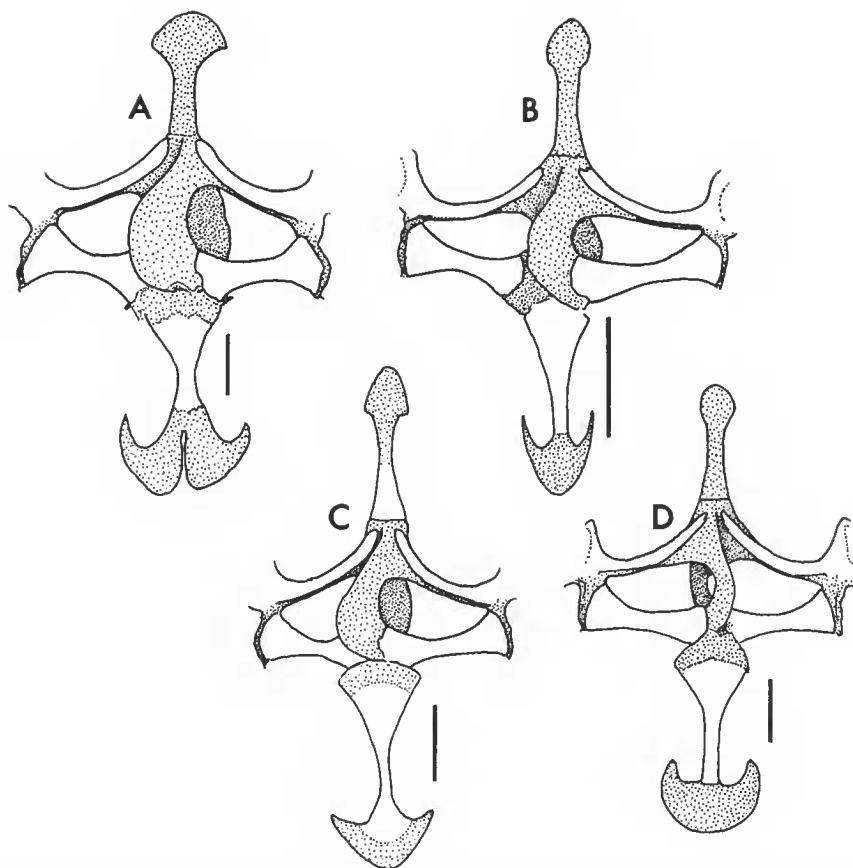


FIG. 4. — Leptodactylid pectoral girdles in ventral view. (A) *Linnomedusa macroglossa* (MCZ 22977-84, untagged specimen), (B) *Adenomera marmorata* (KU 166464), (C) *Lithodytes lineatus* (MCZ 97008), (D) *Vanzolinius discodactylus* (KU 126241).

*Leptodactylus* (*sensu* HEYER, 1974b), and possibly *Adenomera* as well, be treated as several OTUs and (2) character states be defined more precisely.

The only derived state evident in HEYER's (1974a) analysis uniting all of the taxa here included in the 'leptodaetyline genera' is state 83 (Ilium with a well-developed dorsal crest). That state appears in a variety of leptodaetylids (LYNCH, 1971) including *Eleutherodactylus nigrovittatus*, a species HEYER (1975) considered allied to *Barycholos pulcher*.

*Adenomera*, *Leptodactylus*, *Lithodytes*, and *Vanzolinius* are probably very closely related to one another. The similarities in their pectoral girdles (fig. 4, B-D) impresses this opinion on me. The long, thin osseous sternum with a spade-like xiphisternum is unique in the family and because it occurs in so few otherwise similar frogs is probably derived. The uniqueness of the derivation is not on secure grounds because a similar architecture is seen in *Pseudopaludicola*. The pectoral girdle of *Barycholos* (fig. 1) is also probably a

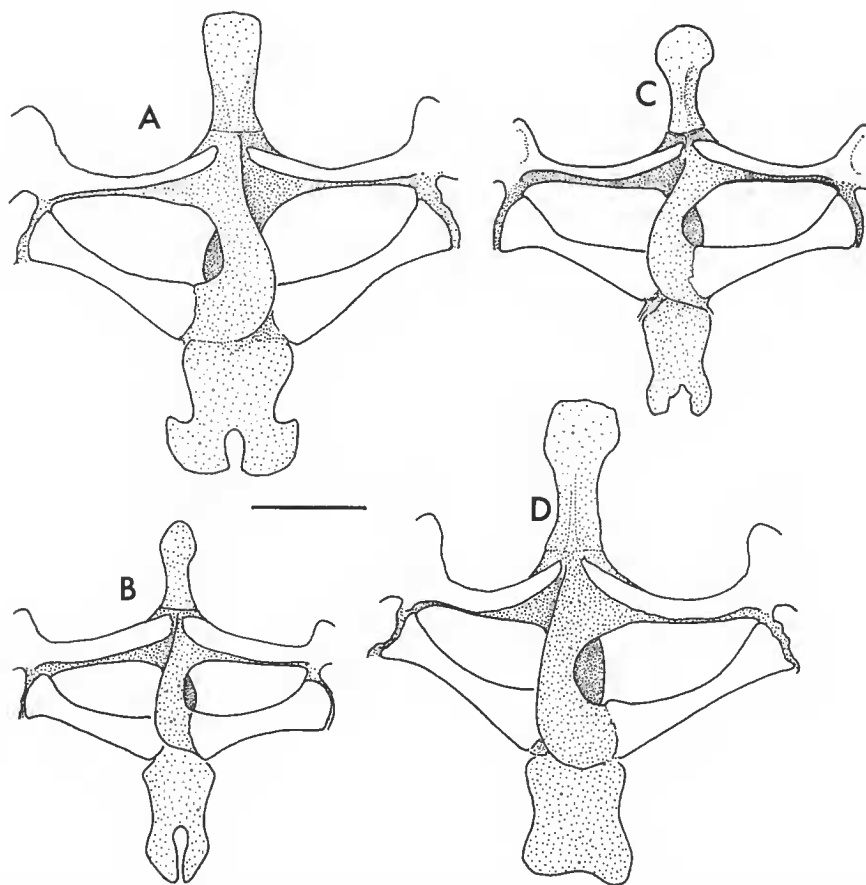


FIG. 5. — Ventral views of pectoral girdles of (A) *Eleutherodactylus mantipus* (LACM 47133), and *E. nigrovittatus*, (B) northeastern Perú (MNHNP 1978-2839), (C) base of Andes in Ecuador (MCZ 90312), and (D) Andean slope (USNM JAP 3852). Cartilage is stippled. Scale is 2 mm.

derived state but is quite unlike that seen in the leptodactylines *sensu stricto* (*Adenomera*, *Leptodactylus*, *Lithodytes*, and *Vanzolinius*). HEYER's (1975) view that *Barycholos* is allied to *E. nigrovittatus* appears consonant with all evidence now available.

*Barycholos pulcher*, *B. savagei*, and *E. nigrovittatus* are similar in habitus (size, shape, and proportions) and all three are terrestrial frogs without distinctive markings. The two *Barycholos* have calcified mesosterna and paired xiphisterna (fig. 1), broad interchoanal region of the palate (fig. 2), and no suggestion of discs on the toe pads (contrary to LYNCH's, 1974, remarks). *Eleutherodactylus nigrovittatus* has a cartilaginous, posteriorly bifurcated sternum (fig. 5), narrow interchoanal region of the palate (fig. 2), and distinctive toe pads bearing elongate discs on the ventral surfaces of the pads but lacks any evidence of pads or discs on the fingers (fig. 6).

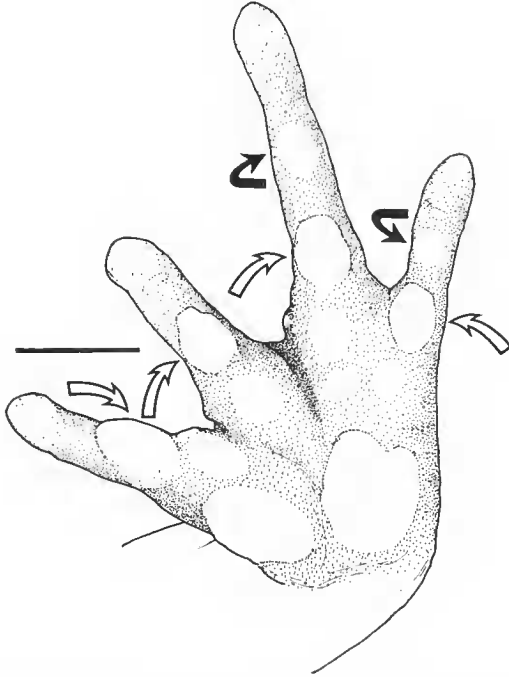


FIG. 6. — Palmar view of *Eleutherodactylus nigrovittatus* (MNHN 1978-2839). Scale is 1 mm. Open arrows point to basal subarticular tubercles ; closed arrows point to distal tubercles.

#### THE STATUS OF *Phyzelaphryne miriamae*

HEYER (1977) named *Phyzelaphryne miriamae* on the basis of four specimens from Igarapé Puruzinho at the Rio Madeira, Estado Amazonas, Brasil. He referred four Colombian frogs (Yapima, Departamento Vaupés, Colombia) to *P. miriamae*. The proposal of the genus and species are apparently the product of two errors (1) a possibly *a priori* belief in a "leaf litter adaptive complex" and (2) doing taxonomy exclusively by quantitative methods.

Frogs, like any other group of organisms, exhibit an uncounted matrix of characteristics, only some of which are readily reduced to precise character-state sets. Most taxonomists are familiar with the group of organisms with which they work and are storehouses of trivia concerning part or all of the specimens they have ever examined. Access to that storehouse is personal and over a lifetime a biologist endeavors to reveal as much of that storehouse as possible ; in the interim he or she is able to provide seemingly 'instant identifications'. Quantitative methods are certainly of considerable value in taxonomy but are somewhat like keys. Simply because a specimen will 'key-out' in a couplet does not insure that the organism has been properly identified.

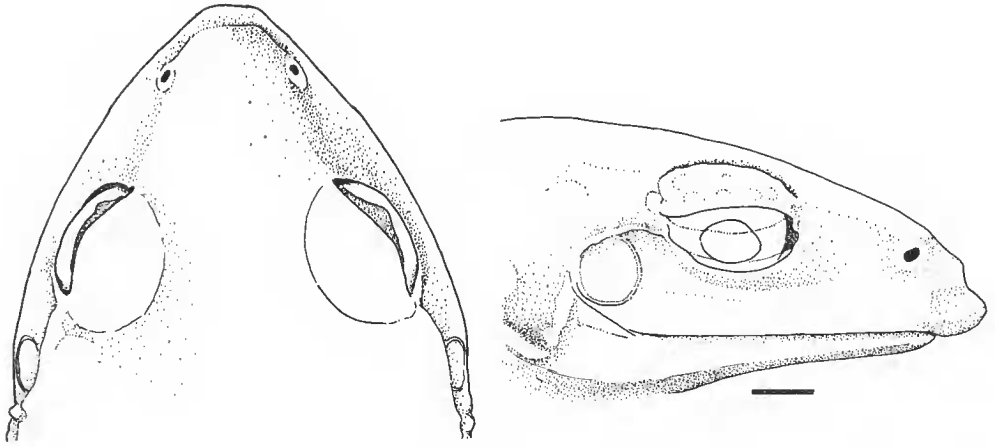


FIG. 7. — Head of adult male *Eleutherodactylus nigrovittatus* (MCZ, not catalogued, Rio Caiwima, Depto. Amazonas, Colombia) showing fleshy keel on snout. Scale is 1 mm.

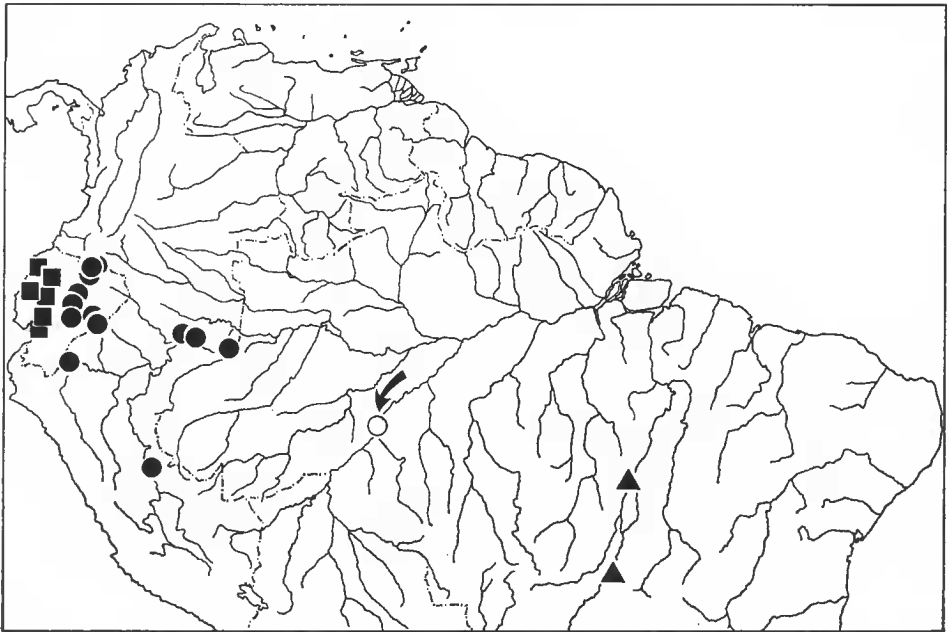


FIG. 8. — Distributions of *Barycholos pulcher* (squares), *B. savagei* (triangles), and *Eleutherodactylus nigrovittatus* (circles). The type-locality of *Phyzelaphryne mirianae* is indicated by the arrow.

As I read HEYER's (1977) description and inspected the illustration, I realized that I had seen the frog before. Aside from certain features (examined below), *Phyzelaphryne miriamae* seemed identical to frogs I called *Eleutherodactylus nigrovittatus*. LYNCH (1980) and LYNCH and DUELLMAN (1980) reported that lowland populations of *E. nigrovittatus* consisted of much smaller frogs than did the populations found on the Amazonian slopes (> 1 000 m) in Ecuador. HEYER (1977) distinguished *Phyzelaphryne miriamae* from *Eleutherodactylus* (including *E. nigrovittatus*) because he thought the distal subarticular tubercle of finger IV lost. In *E. nigrovittatus*, the proximal subarticular tubercles are proportionately large and are more distinct than the distal tubercles of fingers III and IV (fig. 6). The distal tubercles are only slightly more pungent (when viewed from the side) than are the supernumerary palmar tubercles (4-5 in number). HEYER reported discs on the fingers but his term disc = pad as used here. I do not find circumferential grooves (and thus discs) on the fingers; in this regard, *E. nigrovittatus* resembles *E. sulcatus*. I consider the first finger longer than the second (contrary to HEYER's statement that they are about equal in length).

The Amazonian slope populations of *E. nigrovittatus* differ from Amazonian Basin populations in size, in having more distinct distal subarticular tubercles on fingers III and IV, and in the size and shape of the sterna (fig. 5B, D). However, specimens from the base of the Andes (vicinity of Puyo, Ecuador), are intermediate in sternal morphology (fig. 5C). The slope and Basin populations are inseparable on the basis of color pattern, coloration, absence of vocal slits, sac, and nuptial pads in males, and in the presence of a fleshy keel about the snout in males (fig. 7). The ridge probably functions in the building of a burrow. Males have long folds on the floor of the mouth but do not have vocal slits. The males referred to *P. miriamae* by HEYER are not available for study but are probably not conspecific with *Phyzelaphryne miriamae* which is here referred to the synonymy of *Eleutherodactylus nigrovittatus*.

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